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Datasheet for the decision of 8 February 2019

Case Number: T 2511/16 - 3.3.09

Application Number: 11186744.6

Publication Number: 2460846

IPC: C08J5/24, C08K7/06, C08L101/00

Language of the proceedings: EN

Title of invention:
An epoxy resin composition, prepreg and carbon fiber reinforced composite materials

Patent Proprietor:
Toray Industries, Inc.

Opponent:
Teijin Carbon Europe GmbH

Headword:

Relevant legal provisions:
EPC Art. 76(1), 84, 100(c), 111(1), 123(2)
RPBA Art. 13

Keyword:
Main request: admitted (yes), added matter (no), clarity (yes)
Remittal for further prosecution

Decisions cited:

Catchword:

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Beschwerdekammern

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Case Number: T 2511/16 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 8 February 2019

Appellant: (Patent Proprietor)	Toray Industries, Inc. 1-1, Nihonbashi-Muromachi 2-chome Chuo-ku Tokyo 103-8666 (JP)
Representative:	Mewburn Ellis LLP City Tower 40 Basinghall Street London EC2V 5DE (GB)
Respondent: (Opponent)	Teijin Carbon Europe GmbH Kasinostr. 19-21 42103 Wuppertal (DE)
Representative:	Henkel, Breuer & Partner Patentanwälte Brienner Strasse 1 80333 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 19 September 2016 revoking European patent No. 2460846 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	W. Sieber
Members:	N. Perakis
	E. Kossonakou

Summary of Facts and Submissions

I. This decision concerns the appeal filed by the patent proprietor against the opposition division's decision revoking European patent No. 2 460 846, which had been granted on a divisional application of earlier European patent application No. 07792059.3.

II. In the notice of opposition, the opponent had requested revocation of the patent in its entirety on the grounds under Article 100(a) (lack of novelty and lack of inventive step) and 100(b) EPC. The late-filed fresh ground of opposition under Article 100(c) EPC in conjunction with Articles 76(1) and 123(2) EPC had been admitted into the proceedings by the opposition division (see decision: Reasons, 14).

III. Claim 1 as granted reads as follows:

"1. An epoxy resin composition for use in a carbon fiber reinforced composite material, the epoxy resin composition containing an epoxy resin [B], and satisfying the following (1):

(1) a thermoplastic resin particle or fiber [C] and a conductive particle or fiber [D] are contained, and the weight ratio expressed by [content of [C] (parts by weight)]/[content of [D] (parts by weight)] is 1 to 1000;

wherein the epoxy resin composition is for making a laminate with conductivity in the thickness direction by being laminated between two carbon fiber layers constituted with carbon fiber [A]."

IV. The opposition division decided that the subject-matter of claim 1 of the main request (claims as granted) extended beyond the content of the divisional

application as filed/the earlier application as filed (Article 100(c) EPC).

With regard to the auxiliary requests it decided that:

- claim 1 of the first auxiliary request did not satisfy the requirement of Article 123(3) EPC;

- claim 1 of the second and the third auxiliary requests did not satisfy the requirements of Articles 84 and 76(1) EPC;

- claim 1 of the fourth to seventh auxiliary requests did not satisfy the requirement of Article 76(1) EPC; and

- claim 1 of the eighth to ninth auxiliary requests did not satisfy the requirement of Article 123(3) EPC.

The opposition division noted that with regard to added subject-matter, equal reference could be made to Articles 76(1) and 123(2) EPC, since the description of the divisional application as filed was identical to the description of the earlier application as filed.

The opposition division did not deal with the other grounds for opposition raised in the notice of opposition, namely those under Article 100(a) (lack of novelty and lack of inventive step) and 100(b) EPC.

V. The patent proprietor (in the following the appellant) requested that the decision under appeal be set aside and that the case be remitted to the opposition division for examination of the opponent's attacks under Article 100(a) and 100(b) EPC in respect of

either the granted claims or the claims of each of the first to ninth auxiliary requests, all auxiliary requests filed with the statement setting out the grounds of appeal dated 27 January 2017.

VI. By letter of 30 May 2017, the opponent (in the following the respondent) requested that the appeal be dismissed.

VII. On 4 December 2018, the board, in preparation for the oral proceedings, issued a preliminary non-binding opinion on the question of added subject-matter.

VIII. By letter of 21 December 2018, the appellant replied to the board's observations and filed a new main request and new auxiliary requests 1 to 9 to replace the corresponding requests on file. The only change regarding the new main request was the deletion of dependent claims as compared to the main request previously on file.

IX. By letter of 14 January 2019, the respondent requested that the appellant's request for remittal of the case to the opposition division be dismissed.

X. On 8 February 2019, oral proceedings were held before the board. During these proceedings the appellant replaced the main request by a new main request. The respondent withdrew its objection to the remittal of the case to the opposition division.

Claim 1 of the new main request differs from claim 1 as granted (see point III above) in that the expression

"the epoxy resin composition **containing** an epoxy resin [B]"

is replaced with the expression

"the epoxy resin composition **consisting of** an epoxy resin [B]" (emphasis added by the board).

Dependent claims 3, 7 to 9 and independent claim 10 of the new main request read as follows:

"3. An epoxy resin composition for use in a carbon fiber reinforced composite material according to claim 1, wherein each of the thermoplastic resin particle or fiber [C], and the conductive particle or fiber [D] has an average diameter of 1 to 150 μm."

"6. An epoxy resin composition for use in a carbon fiber reinforced composite material according to any one of claims 1 to 5, wherein a thermoplastic resin is dissolved in the epoxy resin [B]."

"7. An epoxy resin composition for use in a carbon fiber reinforced composite material according to claim 6, wherein the thermoplastic resin is a polyethersulfone."

"8. An epoxy resin composition for use in a carbon fiber reinforced composite material according to any one of claims 1 to 7, wherein the epoxy resin [B] is at least one resin selected from the group consisting of a glycidyl amine type epoxy resin and a glycidyl ether type epoxy resin."

"9. An epoxy resin composition for use in a carbon fiber reinforced composite material according to any one of claims 1 to 8, wherein a diaminodiphenyl sulfone is a hardener of the epoxy resin."

"10. A prepreg having two carbon fiber layers constituted with carbon fiber [A], and an inter-formative layer constituted with the epoxy resin composition according to any one of claims 1 to 9 which inter-formative layer is located between the two carbon fiber layers."

XI. The relevant arguments put forward by the appellant in its written submissions and during the oral proceedings may be summarised as follows:

- The new main request should be admitted into the proceedings. The appellant became aware of the different interpretations of the term "epoxy resin composition" only during the oral proceedings before the board. The new main request overcomes the objection of added matter raised by the respondent regarding this term. The new main request does not raise new issues which would require adjournment of the oral proceedings.

- The subject-matter of claim 1 is disclosed in the earlier application as filed/the divisional application as filed. It, therefore, fulfils the requirements of Articles 76(1) and 123(2) EPC.

- Moreover, the subject-matter of claim 1 is clear. The amendment inserted by replacing "containing an epoxy resin [B]" with "consisting of an epoxy resin [B]" does not change the meaning of the epoxy resin [B], which remains the same as defined in the earlier application as filed.

- The subject-matter of claim 3 has been amended to delete the erroneous reference to "and the

conductive fiber [E]", an embodiment of the earlier application as filed but no longer relied upon in the present divisional patent. This deletion does not justify an objection under Articles 76(1) and 123(2) EPC.

- The various embodiments in the subject-matter of dependent claims 6 to 9 and independent claim 10 are directly and unambiguously derivable from the earlier application as filed/the divisional application as filed. Therefore, these claims fulfil the requirements of Articles 76(1) and 123(2) EPC.

XII. The relevant arguments put forward by the respondent in its written submissions and during the oral proceedings may be summarised as follows:

- The new main request should not be admitted into the proceedings. Claim 1 of the new main request contains substantial amendments which do not originate from granted claims but from the description and do not *prima facie* overcome the raised objections.

- Claim 1 as amended contains subject-matter extending beyond the content of the earlier application as filed.

  - The earlier application as filed does not disclose a thermosetting resin composition, let alone an epoxy resin composition.

  - The ratio [B]/[C] as disclosed in the earlier application as filed relates to the content of [C] and [D] in the carbon fiber reinforced

composite material (CFRC), whereas in claim 1 it concerns the content of [C] and [D] in the epoxy resin composition.

- The earlier application as filed concerns prepregs with carbon fibers as an essential feature. The carbon fibers have, however, been left out from the claimed epoxy resin composition.

- The earlier application as filed discloses that the carbon fiber layers of the prepreg contain carbon fiber [A] and thermosetting resin [B], whereas in the laminate referred to in claim 1 the carbon fiber layers contain only carbon fiber [A].

- The earlier application as filed discloses that the prepreg laminate which provides the CFRC laminate has been cured, whereas claim 1 does not disclose such curing.

- The subject-matter of claim 1 lacks clarity. The amendment, which is not based on a granted dependent claim but appears to result from the description of the earlier application as filed, renders the meaning of the term "epoxy resin [B]" unclear.

- The subject-matter of claim 3, as amended, extends beyond the content of the earlier application as filed.

- Dependent claims 6 to 9 contain embodiments which are not disclosed in the earlier application as filed.

- The subject-matter of independent claim 10, which does not specify that the carbon fiber layers contain a thermosetting resin, extends beyond the content of the earlier application as filed.

Reasons for the Decision

1. Admission of the new main request

The appellant filed the new main request during the oral proceedings before the board in order to overcome one of the objections under added matter raised against claim 1 of the then valid main request. This objection concerned the open definition of the epoxy resin composition (using the term "containing"). The appellant admitted that it became aware of the problem concerning this term for the first time during the discussion at the oral proceedings.

The board concedes that this issue emerged for the first time during the discussion at the oral proceedings. Furthermore, since the new main request did not raise new issues which the board or the respondent could not reasonably be expected to deal with without adjournment of the oral proceedings (Article 13(3) RPBA), the board admitted it in the proceedings.

Indeed, the only amendment in claim 1 was the replacement of the term "containing" with "consisting of" by which the open definition of the epoxy resin composition was limited to components [B], [C] and [D]. Claim 3 was amended by deleting the erroneous reference to particle or fiber [E], an embodiment of the earlier

application as filed not pursued in the divisional patent. Claims 6 and 9 were also amended in order to take into account the term "consisting" in claim 1. These amendments did not raise new issues which the board or the respondent could not reasonably be expected to deal with without adjournment of the oral proceedings (Article 13(3) RPBA)

2. Claim 1 - added matter

2.1 The patent in suit had been granted on a divisional application of earlier European patent application No. 07792059.3. The issue of added matter therefore has to be assessed under Articles 76(1) and 123(2) EPC. As pointed out already by the opposition division, the description of the divisional application as filed is identical to the description of the earlier application as filed. Thus, any reference in the present decision to the text of the earlier application as filed will also implicitly concern the text of the divisional application as filed. Similarly, any conclusion under Article 76(1) EPC will implicitly lead to the same conclusion under Article 123(2) EPC.

2.2 The subject-matter of claim 1 concerns an epoxy resin composition

- consisting of an epoxy resin [B] and satisfying (1): (1) a thermoplastic resin particle or fiber [C] and a conductive particle or fiber [D] are contained, and the weight ratio expressed by [content of [C] (parts by weight)]/[content of [D] (parts by weight)] is 1 to 1000
(structural definition of the claimed product),

- for use in a carbon fiber reinforced composite material (intended use of the claimed product), wherein the epoxy resin composition is for making a laminate with conductivity in the thickness direction by being laminated between two carbon fiber layers constituted with carbon fiber [A] (intended use of the claimed product).

2.3 It is undisputed that the earlier application as filed does not contain the exact wording of claim 1 of the new main request. However, when assessing compliance with the requirement of Article 76(1) EPC, it has to be established whether the claimed subject-matter is directly and unambiguously derivable by the skilled person from the whole technical content of the earlier application as filed, express or implied (Case Law of the Boards of Appeal of the EPO, 8th edition, July 2016, II.F.2.1.1).

2.4 The earlier application as filed discloses a thermosetting composition, in particular an epoxy resin composition.

2.4.1 The respondent argued that the earlier application as filed related only to a prepreg and to a carbon fiber reinforced composite, but not to a thermosetting composition, in particular not to an epoxy resin composition.

2.4.2 However, the skilled reader assessing the technical content of the earlier application as filed would not unilaterally focus their attention on the explicit disclosure of prepregs and carbon fiber reinforced composite materials (CFRC) as alleged by the respondent and the opposition division. On the contrary, the skilled person would understand from the whole

technical content of the earlier application as filed that the eventually cured CFRC end product is formed from an intermediate prepreg which itself is formed by impregnation of reinforcing fibers [A] with a thermosetting composition of a thermosetting resin [B], particles or fibers [C] and particles or fibers [D]. This multistage manufacture involving a thermosetting composition is explicitly disclosed in example 1 (page 47, lines 12-17). The thermosetting composition is also derivable from the representative prepreg illustrated in figure 1 which comprises an inter-formative layer (2) made from a thermosetting resin 6 (i.e. component [B]), thermoplastic resin particles 3 (i.e. component [C]), and conductive particles 4 (component [D]) (see also the corresponding part of the description page 27, lines 5-13). Such a thermosetting composition is further derivable from the methodology used for the manufacture of the prepreg (page 34, lines 17-24). Although figure 1 and the methodology do not use the term "composition" to qualify the combination of the components [B], [C] and [D], the use of this term to define the combination of these three components in claim 1 does not correspond to new information with which the skilled person is confronted and which is not disclosed in the earlier application as filed.

Furthermore, since the earlier application as filed repeatedly refers to a thermosetting resin [B], a thermoplastic resin particle or fiber [C], and a conductive particle or fiber [D] to prepare the prepreg and the final CFRC, the amendment to a composition "consisting of" components [B], [C] and [D] is also supported by the earlier application as filed.

2.5 The earlier application as filed also discloses that the weight ratio [content of [C] (parts by weight)]/ [content of [D] (parts by weight)] is 1 to 1000 (page 3, lines 6-8).

2.5.1 Nevertheless, the respondent argued that the ratio [B]/ [C] was disclosed in the earlier application as filed with respect to the prepreg, whereas in claim 1 it related to the epoxy resin composition and concluded that claim 1 contained added subject-matter.

2.5.2 The board disagrees. Although this weight ratio is disclosed in the context of the prepreg, it is obvious to the skilled reader that it equally applies to the thermosetting resin composition. The thermoplastic resin particles or fibers [C] and the conductive particles or fibers [D] are introduced via the impregnation process into the prepreg (page 4, lines 24-29; example 1). Eventually by curing the thermosetting resin [B], an interlayer containing the particles or fibers [C] and [D] is formed between the carbon fiber layers of the final CFRC, and by that the particles or fibers [D] can form conductive paths in the interlayer (page 23, lines 15-30; figure 1).

2.6 The earlier application as filed discloses that the thermosetting resin [B] is preferably an epoxy resin [B] (page 7, lines 16-18), which can only mean to the skilled reader that this preferred thermosetting resin forms the preferred thermosetting composition, namely an epoxy resin composition.

2.7 The respondent argued that although the carbon fibers [A] constituted an essential feature of the claimed epoxy resin composition, claim 1 did not contain this feature.

However, the earlier application as filed disclosed the carbon fibers [A] only in conjunction with the definition of the prepreg and the CFRC. Thus, the carbon fibers are essential for the prepreg and the CFRC, i.e. intended for the further use indicated in claim 1, but not an essential feature of the epoxy resin composition.

2.8 The respondent also argued that the earlier application as filed disclosed that the carbon fiber layers contained not only carbon fiber [A] but also thermosetting resin [B] (page 3, lines 3-4), whereas the carbon fiber layers in claim 1 were constituted only with carbon fiber [A].

The board disagrees. The passage to which the respondent made reference defines the final prepreg product, i.e. the laminate which has been submitted to heat and pressure in order to impregnate the carbon fiber layers with the resin. In contrast, claim 1 relates to the (initial) carbon fiber layers which are used to make the laminate, i.e. before their impregnation with the epoxy resin composition. These carbon fiber layers are constituted with carbon fiber [A].

2.9 Lastly, the respondent argued that the earlier application as filed disclosed that the laminate was cured in order to provide a CFRC with conductivity in the thickness direction (page 3, lines 22-23; page 4, line 27; page 35, lines 11-13; page 47, line 1), whereas claim 1 did not require a curing step.

However, claim 1 refers to the intended use for making a CFRC with conductivity in the thickness direction. A

curing step is implicit to the skilled reader, since curing is a necessary step to manufacture a CFRC.

2.10 In view of the above, the subject-matter of claim 1 is directly and unambiguously derivable from the earlier application as filed.

3. Claim 1 - clarity

The respondent argued during the oral proceedings that the amendment to "consisting of" rendered the term "epoxy resin" unclear.

The board disagrees. First of all, the term "consisting of" relates directly to the epoxy resin composition and limits this composition to three components: the epoxy resin [B] and (via condition (1) of claim 1) a thermoplastic resin particle of fiber [C], and a thermoplastic resin particle of fiber [D]. In contrast, the word "containing" in claim 1 as granted allowed for the presence of further components beyond [B], [C] and [D], for example fillers. The term "epoxy resin" was already present in granted claim 1 and the board agrees with the appellant that the amendment to "consisting of" does not change the meaning of the epoxy resin [B]. Thus, the term "consisting of" used in claim 1 still allows, apart from the epoxy resin as such, the presence of further components, which the skilled person would recognise as being part of an epoxy resin. As even admitted by the respondent, an epoxy resin usually contains a hardener, which is a compound having an active group capable of reacting with the epoxy group of the epoxy resin [B] during curing (page 9, lines 3-4). Furthermore, the earlier application as filed allows the presence of a thermoplastic resin dissolved in the thermosetting resin (page 10,

lines 5-6). Needless to say, the amount of thermoplastic resin that can be dissolved in epoxy resin is not unlimited. The skilled person must still consider the resulting product to be an epoxy resin. Thus, apart from the fact that the amendment does not change the meaning of the epoxy resin [B] (and is thus not objectionable following G 3/14), the meaning of the term is also clear.

4. Claim 3 - added matter

Dependent claim 3 refers to claim 1 and concerns the specific embodiment according to which each of the thermoplastic resin particles or fibers [C] and the conductive particles or fibers [D] has an average diameter of 1 to 150 µm. This feature is disclosed on page 24, lines 1-10, of the earlier application as filed. The deletion of the reference to "and the conductive particle or fiber [E]" (there is no antecedent to a fiber [E] in the previous claims) by no means modifies the content of claim 3 by adding subject-matter extending beyond the content of the earlier application as filed. In fact, the disclosure of conductive particle or fiber [E] concerns another embodiment of the earlier application as filed, which is not part of the present divisional patent.

Thus, the subject-matter of claim 3 is directly and unambiguously derivable from the earlier application as filed.

5. Claim 6 - added matter

Dependent claim 6 refers back to claims 1 to 5 and concerns the specific embodiment according to which a thermoplastic resin is dissolved in the epoxy resin

[B]. The mixing and dissolving of a thermoplastic resin into the thermosetting resin is disclosed as a preferred embodiment on page 10, lines 5-6, of the earlier application. Furthermore, this amounts to a generic disclosure which applies to all feature combinations within the subject-matter of claim 6.

Thus, the subject-matter of claim 6 is directly and unambiguously derivable from the earlier application as filed.

6. Claim 7 - added matter

Dependent claim 7 refers to dependent claim 6 and qualifies the nature of the dissolved thermoplastic resin, which is a polyethersulfone. A polyethersulfone is disclosed on page 10, line 16, of the earlier application as filed as one of the possible thermoplastic resins which can be mixed and dissolved in the thermosetting resin. As a polyethersulfone is used in all examples of the earlier application as filed (see component PES5003P), the skilled reader understands this as a clear pointer to the use of a polyethersulfone as the preferred thermoplastic resin among the list of thermoplastic resins disclosed on page 10, lines 12-17.

Thus, the subject-matter of claim 7 is directly and unambiguously derivable from the earlier application as filed.

7. Claim 8 - added matter

Dependent claim 8 refers back to claims 1 to 7 and concerns embodiments according to which the thermosetting epoxy resin [B] is at least one resin

selected from the group consisting of a glycidyl amine type epoxy resin and a glycidyl ether type epoxy resin. These resins are disclosed on page 7, lines 20-25, of the earlier application as filed as preferred epoxy resins. Moreover, these resins are used in all examples (see components Epikote 825 and ELM434). Thus, there is a pointer towards the selection of these epoxy resins in the earlier application as filed.

Thus, the subject-matter of claim 8 is also directly and unambiguously derivable from the earlier application as filed.

8. Claim 9 - added matter

Dependent claim 9 refers back to claims 1 to 8 and concerns embodiments according to which a diaminodiphenyl sulfone is a hardener of the epoxy resin. The use of a hardener is generically disclosed on page 9, lines 3-4, of the earlier application as filed. The use of a diaminodiphenyl sulfone is preferred for obtaining a cured resin excellent in heat resistance (page 9, lines 16-17). Furthermore, all examples use a diaminodiphenyl sulfone as hardener. Thus, the earlier application as filed contains a clear pointer to the use of a diaminodiphenyl sulfone.

In view of the above, the subject-matter of claim 9 is directly and unambiguously derivable from the earlier application as filed.

9. Claim 10 - added matter

Independent claim 10 relates to a prepreg having two carbon fiber layers and an inter-formative layer located between the two carbon fiber layers. Such a

structure is disclosed on page 26, lines 23-30, and page 27, lines 2-13, of the earlier application as filed. As already explained above in the context of claim 1, the constitution of the carbon fiber layers and the inter-formative layer is directly and unambiguously derivable from the content of the earlier application as filed.

Thus, the subject-matter of claim 10 is directly and unambiguously derivable from the earlier application as filed.

10. Remittal

The decision of the opposition division concerned exclusively the issue of added subject-matter of the main request. Since, however, further issues had been raised in the notice of opposition which were not dealt with in the decision under appeal, the board considers it appropriate to exercise its discretion under Article 111(1) EPC and to remit the case to the opposition division for further prosecution based on the claims of the new main request.

11. Auxiliary requests 1 to 9

Since the board decided to remit the case to the opposition division for further prosecution based on the claims of the new main request, there is no need to examine the appellant's auxiliary requests.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division for further prosecution.

The Registrar: The Chairman:

M. Cañueto Carbajo W. Sieber

Decision electronically authenticated